Cross-group neutralization of HIV-1 and evidence for conservation of the PG9/PG16 epitopes within divergent groups of HIV-1

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Cross-group neutralization of HIV-1 and evidence for conservation of the PG9/PG16 epitopes within divergent groups of HIV-1

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Background

HIV-1 has been classified into 4 groups: M, N, O and P. The aim was to revisit the cross-group neutralization using a highly diverse panel of primary isolates (PI) and human monoclonal neutralizing antibodies (mAb).

Methods

The panel of viruses included 9 HIV-1 group O PIs, 1 recombinant M/O PI, 1 group N PI, 1 group P PI, 2 group M (subtype B) PIs and the HIV-1 group M adapted strain MN. All the viruses were tested for neutralization in TZM-bl cells, using a panel of sera issued from patients infected by HIV-1 group M viruses (n=11), HIV-1 groups O (n=12) and P (n=1). The mAbs were b12, 2G12, 2F5, 4E10, PG9, PG16, VRC01, VRC03 and HJ16.

Results

The 12 group O sera neutralized from 1 to 6 group O viruses, and 6 of them cross-neutralized one group M PI. Five of the 10 group M sera cross-neutralized from 4 to 9 group O PIs. The group N and P viruses were neutralized by 1-4 of 12 and 4-5 of 11 sera from groups O and M patients, respectively. The human mAbs did not show any cross-group neutralization, except PG9 and PG16. Two group O PIs were neutralized by both PG9 and PG16, and one group O PI was neutralized by PG9 only. The group N PI was highly sensitive to neutralization by PG9 and PG16. The N-linked glycans at positions 156 and 160 and the cationic residues of strand C of the V1/V2 domain that have been identified as part of the PG9 epitope are conserved among the group N.

Conclusion

The cross-group neutralization of HIV-1 has been demonstrated. The conservation of the PG9 and PG16 epitopes between groups provides an argument for their relevance as components of a potentially efficient HIV vaccine.

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